REMARKS

This Amendment is submitted in response to the Office Action dated October 23, 2002, having a shortened statutory period set to expire January 23, 2003. Claims 1-24 are currently pending in the present application. Applicant has added claim 25.

Drawings

In paragraph 2 of the present Office Action, the drawings were objected to because blocks in Figures 1 and 2 lack labeling. The blocks in Figures 1 and 2 have been labeled in accordance with the description of the preferred embodiment. The proposed amendments to these figures are attached hereto.

Specification

In paragraphs 3 and 4 of the present Office Action, the abstract of the disclosure was objected to because of the language used to describe the invention. The abstract has been amended to comply with MPEP § 608.01(b). No new matter has been added in making this amendment.

Claim Objections - 37 C.F.R § 175(c)

In paragraph 5 of the present Office Action, Claims 10 and 22 have been objected to under 37 C.F.R. § 175(c) as being of improper dependent form for failing to further limit the subject matter of a previous claims. Applicants respectfully point out that Claims 10 and 22 both recite additional features not found in the base claim or intervening claims. Specifically, Claims 10 and 22 both recite that the"data switch includes a plurality of input sections transmitting data to said congested output buffer." This feature is not found in Claims 1 and 13 respectively.

Claim Rejections - 35 U.S.C. § 102

In paragraph 6 of the present Office Action, Claims 1-24 have been rejected under 35 U.S.C. § 102(b) as being anticipated by *Fichou*, U.S. Patent 5,790,522 ("*Fichou*"). That rejection is respectfully traversed because Fichou does not teach or suggest the delay of restarting data transmission according to the input buffer occupancy.

In order for a rejection under 35 U.S.C. § 102(b) to be proper, each and every element as set forth in the claims must be found in a single prior art reference. See MPEP 2131. The prior art reference, *Fichou*, relied upon by the Examiner does not include every element as set forth in the claims. Specifically, the independent claims of the present invention recite "delaying restart of data transmission from said input section to said output section in accordance with said determined input buffer occupancy." This feature is not disclosed or suggested in *Fichou*.

The Examiner references the passage found in *Fichou*, at column 8, lines 12-17, to teach the delay or restarting data transmission according to the input buffer occupancy (Office Action page 4). The passage reads as follow:

> There can be two timer values T1 and T2. Timer value T1 is used where an NRT packet is being transmitted when congestion is detected. Timer value T2 is used where an NR packet is being transmitted when congestion is detected. T2 is preferably larger than T1 to induce a "priority" between NRT and NR packets.

A NRT packet is a non-real-time packet (column 3, lines 54-55). A NR packet is a non-reserved packet (column 3 line 55).

The prior art relied upon by the Examiner teaches limiting the rate of traffic which leaves input queues even when there is no congestion and none of the traffic is high priority. The limiting of the rate of traffic is referred to as "spacing." Spacing is a function that limits the rate of data transfers through a switch in the absence of high priority traffic and in the absence of backpressure signalling output congestion. In the prior art, if a high priority packet is detected or a backpressure signal has been generated, then the spacing mechanism is overridden. The prior art does not delay the restart of data transmission according to buffer occupancy, but instead bases the restart upon the priority of the data packet. The T1 and T2 values discussed in the passage in the Examiner references are based on the type of data, and not the occupancy of the buffer. In the present invention, the delay of restarting data transmission is based upon the occupancy of the buffer, not the priority of the data.

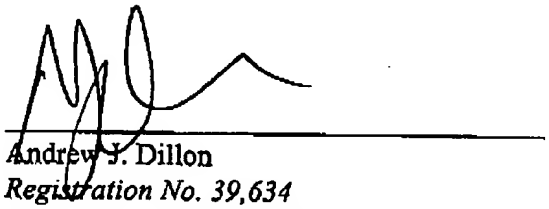
Applicant has added Claim 25, which recites the features found in Claim 1 with an additional limitation. Applicant has amended the relevant claim language to specify the delay of restarting data

transmission is done "without regard to a data priority." Applicant believes such amendment clearly and further distinguishes the present invention from the prior art.

Conclusion

The Applicants having responded to all of the Examiner's rejections, respectfully request a Notice of Allowance for all pending claims. No extension of time is believed to be required in submitting this response; however, in the event that an extension of time is required, please consider that extension requested and please charge any required fee, as well as any other fees necessary to further the prosecution of this application, to **IBM Corporation Deposit Account No. 50-0563**.

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES:

In the Specification:

Please amend the abstract as follows:

A data flow control method and system within a data switch. The data switch includes a plurality of input sections each having an associated input buffer and each transmitting data to an output section. In response to a detection of congestion within the output section, data transmissions from the plurality of input sections to the output section are paused. Input buffer occupancies of each of [said] the input sections are then determined. Thereafter, and in response to a backpressure relief signal, the restart of said data transmission from each of the input sections to the output section is delayed in inverse proportion to each of the determined input buffer occupancies.

In the Claims:

Please amend the claims as follows:

1. (Unchanged) A data flow control method within a data switch having at least one input section which includes an input buffer from which said input section transmits data to an output section through a switching fabric, said data flow control method comprising the steps of:

pausing data transmission from said input section to said output section in response to a detection of congestion within said switching fabric or within said output section;

determining input buffer occupancy of said input section during said pause; and

delaying restart of data transmission from said input section to said output section in accordance with said determined input buffer occupancy.

2. (Unchanged) The data flow control method of claim 1, wherein said data switch further includes an output buffer within said output section and switching fabric for routing data from said input section to said output section, and wherein said step of pausing data transmission from said input section is preceded by the steps of:

detecting a congested condition within said output buffer; and

in response to said detection of a congested condition within an output buffer, generating a backpressure signal within said switch fabric.

3. (Unchanged) The data flow control method of claim 2, wherein said step of detecting a congested condition within said output buffer comprises detecting a backpressure signal from said switching fabric.

4. (Unchanged) The data flow control method of claim 3, wherein said step of pausing data transmission from said input section is initiated in response to said input section receiving said backpressure signal.

5. (Unchanged) The data flow control method of claim 2, wherein said detection of congestion within said output buffer comprises the step of detecting a high level of occupancy within said output buffer.

6. (Unchanged) The data flow control method of claim 5, further comprising the steps of:

monitoring said output buffer for an indication of congestion;

detecting an indication of congestion within said output buffer;

generating a congestion indication signal in response to said step of detecting an indication of congestion;

delivering said congestion indication signal from said switching fabric to said input section; and

pausing data transmission from said input section to said output section in response to said delivery of said congestion indication signal.

7. (Unchanged) The data flow control method of claim 1, wherein said step of delaying restart of data transmission further comprises computing a delay interval.

8. (Unchanged) The data flow control method of claim 7, wherein the duration of said computed delay interval varies inversely with said determined input buffer occupancy.

9. (Unchanged) The data flow control method of claim 1, further comprising the step of defining a plurality of occupancy levels, including a high level and a low level, each uniquely

corresponding to a range of readable buffer occupancy values.

10. (Unchanged) The data flow control method of claim 9, wherein said data switch includes a plurality of input sections transmitting data to said congested output buffer, said method further comprising the steps of:

pausing data transmission from said input sections to said output section in response to a detection of congestion within said switching fabric or within said output section; and

determining buffer occupancies of each of said input buffers during said pause.

11. (Unchanged) The data flow control method of claim 10, wherein said step of determining input buffer occupancies during said pause comprises the steps of:

reading an exact input buffer occupancy value for each of said input sections; and

in accordance with said occupancy level definitions, assigning one of said occupancy levels to each of said input sections in response to said step of reading an exact input section buffer occupancy value.

12. (Unchanged) The data flow control method of claim 10, wherein said data switch further comprises an intelligent control device, and wherein said step of determining input buffer occupancies further comprises the steps of:

in a periodic manner within said intelligent control device:

reading an input buffer occupancy value for each of said plurality of input sections;

associating each of said input section buffer occupancy values with a buffer occupancy level; and

assigning said occupancy levels to corresponding input sections.

13. (Unchanged) A data flow control system within a data switch having at least one input section which includes an input buffer from which said input section transmits data to an output section through a switching fabric, said data flow control system comprising:

means for pausing data transmission from said input section to said output section in response to a detection of congestion within said switching fabric or within said output section;

means for determining input buffer occupancy of said input section during said pause; and

means for delaying restart of data transmission from said input section to said output section in accordance with said determined input buffer occupancy.

14. (Unchanged) The data flow control system of claim 13, wherein said data switch further includes an output buffer within said output section and switching fabric for routing data from said input section to said output section, and wherein said means for pausing data transmission from said input section further comprises:

means for detecting a congested condition within said output buffer; and

means for generating a backpressure signal within said switch fabric in response to detecting a congested condition within an output buffer.

15. (Unchanged) The data flow control system of claim 14, wherein said means for detecting a congested condition within said output buffer comprises means for detecting a backpressure signal from said switching fabric.

16. (Unchanged) The data flow control system of claim 15, wherein said means for pausing data transmission from said input section is initiated in response to said input section receiving said backpressure signal.

17. (Unchanged) The data flow control system of claim 14, wherein said means for detecting congestion within said output buffer comprises means for detecting a high level of occupancy within said output buffer.

18. (Unchanged) The data flow control system of claim 17, further comprising:

means for monitoring said output buffer for an indication of congestion;

means for detecting an indication of congestion within said output buffer;

means for generating a congestion indication signal in response to detecting an indication of congestion;

means for delivering said congestion indication signal from said switching fabric to said input

section; and

means for pausing data transmission from said input section to said output section in response to delivering said congestion indication signal.

19. (Unchanged) The data flow control system of claim 13, wherein said means for delaying restart of data transmission further comprises means for computing a delay interval.

20. (Unchanged) The data flow control system of claim 19, wherein the duration of said computed delay interval varies inversely with said determined input buffer occupancy.

21. (Unchanged) The data flow control system of claim 13, further comprising a plurality of defined occupancy levels, including a high level and a low level, each uniquely corresponding to a range of readable buffer occupancy values.

22. (Unchanged) The data flow control system of claim 21, wherein said data switch includes a plurality of input sections transmitting data to said congested output buffer, said system further comprising:

means for pausing data transmission from said input sections to said output section in response to a detection of congestion within said switching fabric or within said output section; and

means for determining buffer occupancies of each of said input buffers during said pause.

23. (Unchanged) The data flow control system of claim 22, wherein said means for determining input buffer occupancies during said pause comprises:

means for reading an exact input buffer occupancy value for each of said input sections; and

means for assigning one of said occupancy levels to each of said input sections in accordance with said occupancy level definitions.

24. (Unchanged) The data flow control system of claim 22, wherein said data switch further comprises an intelligent control device, and wherein said means for determining input buffer occupancies further comprises:

means for reading an input buffer occupancy value for each of said plurality of input sections;

means for associating each of said input section buffer occupancy values with a buffer occupancy level; and

means for assigning said occupancy levels to corresponding input sections.

25. (Newly Presented) A data flow control method within a data switch having at least one input section which includes an input buffer from which said input section transmits data to an output section through a switching fabric, said data flow control method comprising the steps of:

pausing data transmission from said input section to said output section in response to a detection of congestion within said switching fabric or within said output section;

determining input buffer occupancy of said input section during said pause; and

delaying restart of data transmission from said input section to said output section in accordance with said determined input buffer occupancy without regard to a data priority.

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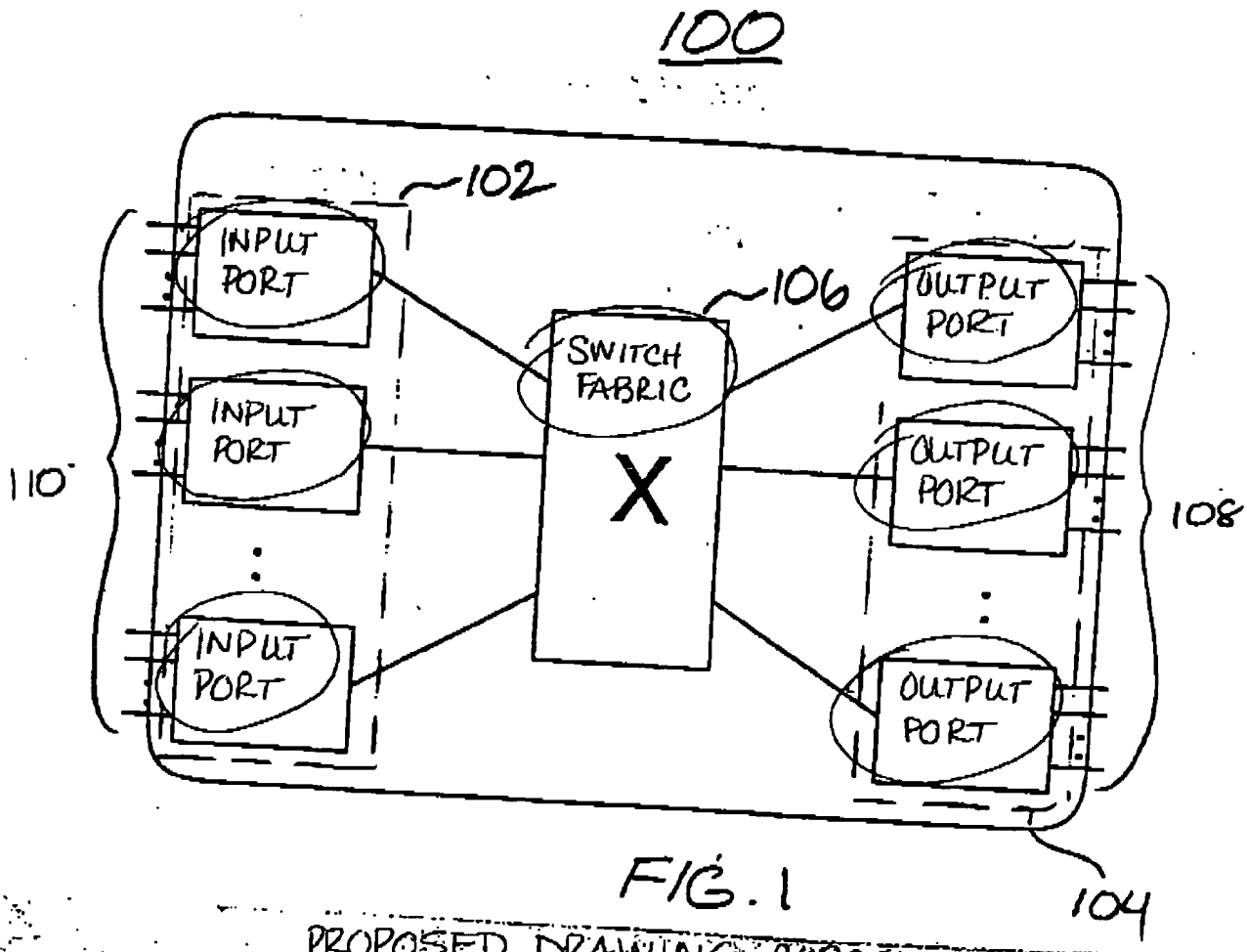

FIG. 1

PROPOSED DRAWING CORRECTIONS

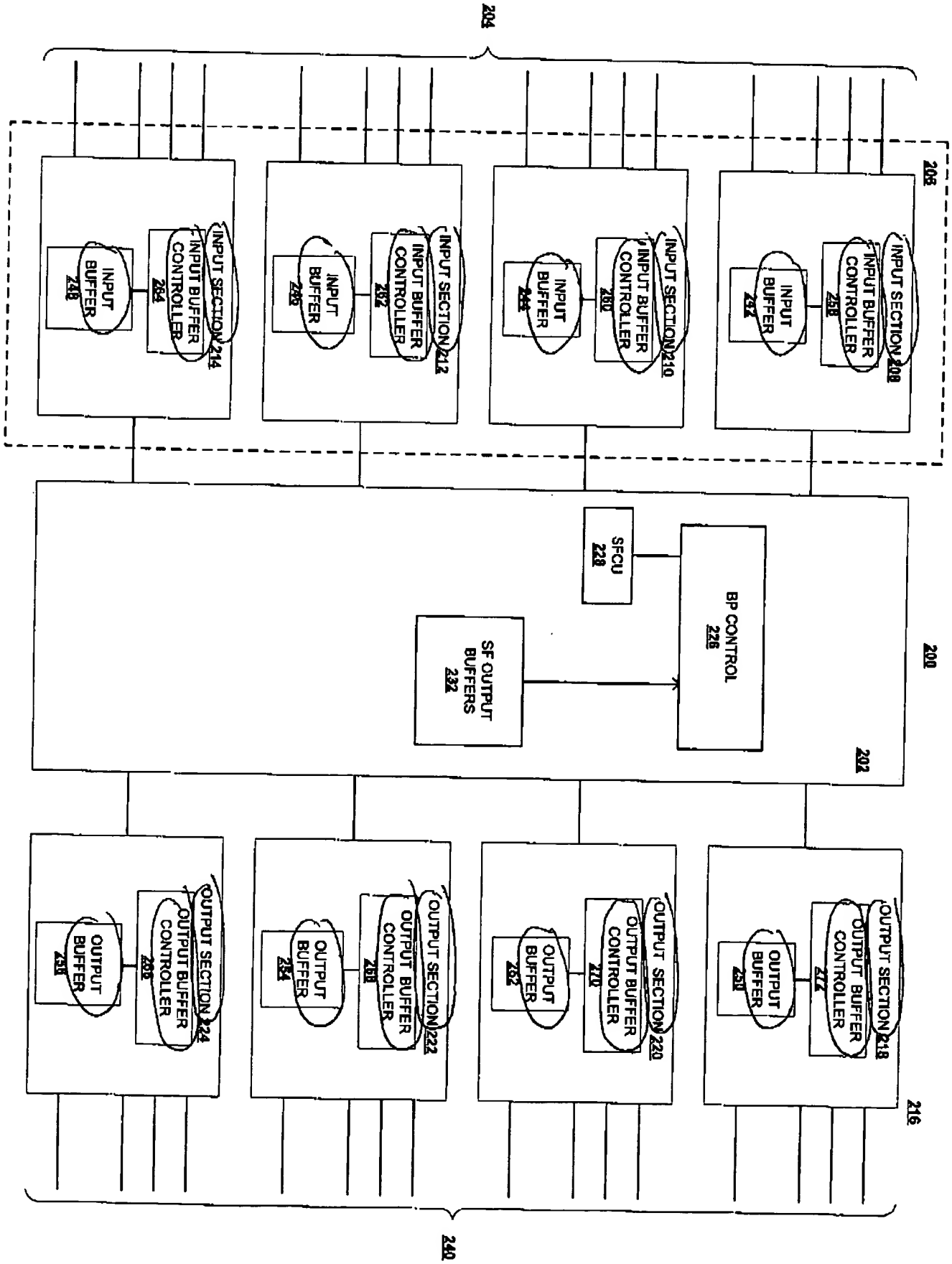

FIGURE 2

(PROPOSED DRAWING CORRECTIONS)